

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An electrolytic phosphate chemical treatment method of forming a film composed of a phosphate compound and a metal that is reduced and precipitated from an ionic state on the surface of a metal material article to be treated, comprising:

performing the electrolytic treatment on said article in a phosphate chemical treatment bath by contacting said metal material article having electrical conductivity with said phosphate chemical treatment bath containing phosphate ions, phosphoric acid, nitrate ions, metal ions that form a complex with the phosphate ions in said phosphate chemical treatment bath, and metal ions for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in said phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential, and potential, wherein

the treatment bath has a pH of less than 2 and is substantially free of metal ions, other than those which are a component of the film which will form sludge; wherein,

Fe is present and the amount of Fe ions dissolved in the treatment bath is controlled by changes in the amount of Fe ions dissolved into the treatment bath from a Fe electrode or a metal material article to be treated of a steel material;

NO₂ and/or N₂O₄ gas is substantially separated from the treatment bath; and
the oxidation-reduction potential (ORP) of said phosphate chemical treatment bath indicated as the potential relative to a standard hydrogen electrode, is maintained at

~~equal to or greater than 770 mV, 770 mV to 960 mV, and is used to monitor the treatment bath.~~

2. (Currently Amended) ~~An electrolytic~~ The electrolytic phosphate chemical treatment method according to claim 1, wherein said electrolytic treatment uses for an electrode material that dissolves in the treatment bath the metal ions that form ~~the complex a complex~~ with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath, the metal material article for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in the phosphate chemical treatment bath are reduced and precipitate as the metal is greater than or equal to -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential, or a metal material that is insoluble during the electrolytic treatment.

3. (Currently Amended) The electrolytic phosphate chemical treatment method according claim 1, further comprising dissolving an amount of Fe ions into the treatment bath from an ~~Fe electrode and the article to be treated, when performing a cathodic treatment of said article to be treated and using the Fe electrode as the electrode that dissolves in the treatment bath, is controlled~~ in order to make said ORP of the phosphate chemical treatment bath equal to or greater than ~~840 mV-800 mV~~ and maintain the amount of Fe ions within a solubility limit of Fe^{3+} ions.

4. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 1, wherein ~~in a case where the article to be treated is a steel material, the method further comprises dissolving an amount of Fe ions into the treatment bath in an anodic treatment in which said steel material to be treated is dissolved as an anode, and the amount of Fe ions that dissolves in the treatment bath from an Fe electrode in a cathodic treatment, are controlled so that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV.~~

5. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein an electrode is used in the electrolytic treatment for making the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV is an insoluble metal material.

6-7. (Canceled)

8. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the metal ions that form a complex with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath are at least one of Zn, Fe, or Mn ions.

9. (Currently Amended) The electrolytic phosphate chemical treatment method according to ~~claim 1, claim 17, wherein N₂O₄ gas generated and dissolved in a treatment tank is removed from the treatment bath the circulation system is provided~~ by separating the treatment tank into an electrolytic treatment tank that carries out ~~the electrolytic electrolytic treatment and an auxiliary tank that does not carry out the electrolytic treatment, electrolytic treatment and~~ circulating the treatment ~~liquid of the treatment bath between the two tanks, and providing a mechanism that opens liquid of the treatment bath to the atmosphere either between the electrolytic treatment tank and the auxiliary tank or within the electrolytic treatment tank and the auxiliary tank, as a means of separating the N₂O₄ gas generated in the treatment bath accompanying the electrolytic treatment of the treatment bath tanks.~~

10. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 9, wherein the auxiliary tank that does not carry out the electrolytic treatment has a mechanism in which the treatment liquid is passed through a permeable solid structure.

11. (Original) The electrolytic phosphate chemical treatment method according to claim 10, wherein the solid structure is a film.

12. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 9, wherein a filter having a mechanism that filters the treatment liquid is used for the auxiliary tank that does not carry out the electrolytic treatment.

13. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 9, further comprising removing, through a liquid circulation circuit, a portion of the treatment liquid at a location prior to being introduced into a filter material in a filter, exposing the removed treatment liquid to the atmosphere, and returning it to the electrolytic treatment tank after separating ~~the gases in the form of nitrogen oxides NO₂ and N₂O₄~~ present in the treatment liquid.

14. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 9, wherein an oxidation-reduction potential of the treatment bath is equal to or greater than ~~-840 mV.~~ 800 mV.

15. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 9, wherein the treatment bath is maintained in a constant state by measuring an oxidation-reduction potential value of the treatment bath and changing an amount and/or composition of replenishing chemical corresponding to the change in that value.

16. (New) The electrolytic phosphate chemical treatment method according to claim 1, wherein the ORP of said phosphate chemical treatment bath is maintained at 800 mV to 960 mV.

17. (New) The electrolytic phosphate chemical treatment method according to claim 1, wherein separating NO₂ and/or N₂O₄ gas from the treatment bath comprises circulating treatment liquid of the treatment bath via a circulation system which circulates the treatment liquid under pressure using a pump from a treatment tank to the same, and exposing

the treatment liquid to the atmosphere in the circulation system, so that dissolved NO₂ and/or N₂O₄ gas can easily escape from the treatment liquid.